1125-42-1004 **Azita Mayeli*** (amayeli@gc.cuny.edu). *Fuglede Conjecture in finite vector spaces over prime fields.*

The equivalence relation between tiling and spectral property of a set has its root in the Fuglede Conjecture a.k.a Spectral Set Conjecture in $\mathbb{R}^d$, $d \geq 1$. In 1974, Fuglede asserted that a Lebesgue measurable set $\Omega \subset \mathbb{R}^d$, with positive and finite measure, tiles $\mathbb{R}^d$ by its translations if and only if the Hilbert space $L^2(\Omega)$ possesses an orthogonal basis of exponentials. A variety of results were proved for establishing connection between tiling and spectral property for some special cases of $\Omega \subset \mathbb{R}^d$. However, the conjecture is false in general for dimensions 3 and higher.

Let $E \subseteq \mathbb{F}_q^2$, where q is a prime and $\mathbb{F}_q^2$ is the vector space over the prime field $\mathbb{F}_q$. In this talk we shall show that every function $f : E \to \mathbb{C}$ can be expanded as a linear combination of characters orthogonal in $L^2(E)$ if and only if E tiles $\mathbb{F}_q^2$ by translations. In other words, we prove that the Fuglede Conjecture holds for $\mathbb{F}_q^2$. We will also discuss the background and the history of this problem in a variety of settings. (Received September 13, 2016)